Notice of Allowability	Application No.	Applicant(s)	
	09/729,867	HARTMANN ET AL.	
	Examiner	Art Unit	
	Vikkram Bali	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *6/19/2006*.

2. ☒ The allowed claim(s) is/are *(1, 3-6, 14-15, 18, 20-22, 33-34, 43-46, 51-52, 60, and 62 (renumbered as 1-21)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ashley Ott, Reg. # 55,515 on 8/31/2006.

The application has been amended as follows:

In claims:

1. A method to train image classification, comprising:

measuring noise and edge sharpness in a first image;

generating a feature vector from the first image by:

generating a noise-reduced second image from the first image;

calculating a difference between the first image and the second image;

generating a noise pixel histogram of the difference to use as a noise feature vector;

generating a blurred third image from the first image;

calculating another difference between the first image and the third image;

generating a sharpness pixel histogram of the another difference to use as a sharpness feature vector; and

combining the noise feature vector and the sharpness feature vector as the feature vector; and

training a classification model from the feature vector to classify a fourth image as a natural image versus an artificial image from the noise and the edge sharpness in the fourth image.

2. (Canceled)

3. The method of claim 1, wherein generating the noise-reduced second image further comprises applying a median filter to the first image.

4. The method of claim 1, wherein generating the noise-reduced second image further comprises applying a Gaussian filter to the first image.

5. The method of claim 1, wherein generating the noise-reduced second image further comprises applying a Wiener filter to the first image.

6. The method of claim 1, wherein the first image further comprises a frame in a video stream.

7. (Cancel)

8. (Cancel)

9. (Canceled)

10. (Cancel)

11. (Cancel)

12. (Cancel)

13. (Canceled)

14. (Currently Amended) A method to classify a first image as natural image versus artificial image, further comprising:

receiving a feature vector of the first image, wherein the feature vector comprises ~~one or more~~ a combination of a noise vector and a sharpness vector of the first image;

classifying the first image as natural image versus artificial image from the feature vector; and

generating the classification of the image;

wherein the classifying is based on training from the combination ~~one or more~~ of a noise feature vector and a sharpness feature vector, the noise feature vector ~~comprising~~ including a pixel histogram of a difference between a second image and a noise-reduced third image generated from the second image, and the sharpness feature vector ~~comprising~~ including a pixel histogram of a difference between the second image and a blurred fourth image generated from the second image.

15. The method of claim 14, wherein the classification is performed on a set of video frames of a video sequence, and the most likely classification result emerging out of the classification results of the individual frames is taken as the class of the video sequence.

16.-17. (Canceled)

18. (Currently Amended) An image classification system comprising:

a feature extraction component to extract a feature that distinguishes a frame in a video stream between a natural[[ly-looking]] image versus an artificial[[ly-looking]] image; and

a training system operably coupled to the feature extraction component to train a classification model to distinguish the feature based on ~~one or more~~ a combination of a noise feature vector and a sharpness feature vector; [[,]]

wherein the noise feature vector ~~comprising~~ includes a pixel histogram of a difference between a first image and a noise-reduced second image generated from the second image, and the sharpness feature vector ~~comprising~~ includes a pixel histogram of a difference between the first image and a blurred third image generated from the first image.

19. (Canceled)

20. The system of claim 18, wherein the classification is performed on a set of video frames of a video sequence, and the most likely classification result emerging out of the classification results of the individual frames is taken as the class of the video sequence.

21. (Currently Amended) A system to classify an image comprising:

a processor;

a storage device coupled to the processor;

a training system coupled to the processor to train classification of at least one image as either a natural image or an artificial image based on a combination of a noise feature vector and a sharpness feature vector, the noise feature vector including a pixel histogram of a difference between a first image and a noise-reduced second image generated from the first image, and the sharpness feature vector including a pixel

histogram of a difference between the first image and a blurred third image generated from the first image; and

a classification component coupled to the processor to classify the at least one image as either a natural image or an artificial image based on the trained classification and utilizing a noise vector and a sharpness vector of the least one image.

22. The system of claim 21, wherein the at least one image further comprises at least one frame in a video stream.

23. (Canceled)

24. (Cancel)

25. (Cancel)

26-29. (Canceled)

30. (Cancel)

31. (Cancel)

32. (Canceled)

33. (Currently Amended) A computer-readable medium encoded with a computer program having computer-executable instructions to cause a computer to perform a method comprising:

measuring noise and edge sharpness in a first image;

generating a feature vector from [[a]] the first image by:

generating a noise-reduced second image from the first image;

calculating a difference between the first image and the second image;

generating a noise pixel histogram of the difference to use as a noise feature vector;

generating a blurred third image from the first image;

calculating another difference between the first image and the third image;

generating a sharpness pixel histogram of the another difference to use as a sharpness feature vector; and

combining the noise feature vector and the sharpness feature vector as the feature vector

~~, wherein the feature vector is one or more of a noise feature vector and an edge-sharpness feature vector, the noise feature vector a pixel histogram of a difference between the first image and a noise-reduced second image generated from the first image, and the sharpness feature vector comprising a pixel histogram of a difference between the first image and a blurred third image generated from the first image~~; and

training a classification model from the feature vector to classify a fourth image as a natural image versus an artificial image from the noise and the edge sharpness in the fourth image~~;~~

~~wherein the training is based on the feature vector~~.

34. The computer-readable medium of claim 33, wherein the first image further comprises a frame in a video stream.

35-36. (Canceled)

37. (Cancel)

38. (Cancel)

39. (Canceled)

40. (Cancel)

41. (Cancel)

42. (Canceled)

43. (Currently Amended) A computer-readable medium encoded with a computer program having computer-executable instructions to cause a computer to perform a method comprising:

receiving a feature vector of a first image, wherein the feature vector is a combination ~~one or more~~ of a noise vector and a~~n edge~~-sharpness vector of the first image;

classifying the first image as natural image versus an artificial image from the feature vector; and

generating the classification of the image;

wherein the classifying is based on training from ~~one or more~~ a combination of a noise feature vector and a sharpness feature vector, the noise feature vector ~~comprising~~ including a pixel histogram of a difference between a second image and a noise-reduced third image generated from the second image, and the sharpness feature vector including a pixel histogram of a difference between the second image and a blurred fourth image generated from the second image.

44. The computer-readable medium of claim 43, wherein the classification is performed on a set of video frames of a video sequence, and the most likely classification result emerging out of the classification results of the individual frames is taken as the class of the video sequence.

45. (Currently Amended) An apparatus to train classification of at least one image, comprising:

a processor;

a storage device coupled to the processor; and

a training system coupled to the processor to train classification of at least one image as either a natural image or an artificial image, wherein the training system further comprises a generator of a noise feature vector and ~~an edge~~ sharpness feature vector of the at least one image;

wherein the classification is based on training from ~~one or more~~ a combination of the noise feature vector and the sharpness feature vector, the noise feature vector including ~~that is~~ a pixel histogram of a difference between a first image and a noise-reduced second image generated from the first image, and [[a]] the sharpness feature vector ~~that is~~ including a pixel histogram of a difference between the first image and a blurred third image generated from the first image.

46. The apparatus of claim 45, wherein the at least one image further comprises at least one frame in a video stream.

47. (Canceled)

48. (Cancel)

49. (Cancel)

50. (Canceled)

51. (Currently Amended) An apparatus to classify an image, comprising:

a processor;

a storage device coupled to the processor; and

a classification component coupled to the processor to classify a first image as either a natural image or an artificial image, wherein the classification component further comprises a feature vector generator to generate ~~one or more~~ both of a noise vector and a ~~edge~~-sharpness vector of the first image;

wherein the classifying is based on training from ~~one or more~~ a combination of a noise feature vector and a sharpness feature vector, the noise feature vector ~~comprising~~ including a pixel histogram of a difference between a second image and a noise-reduced third image generated from the second image, and the sharpness feature vector ~~comprising~~ including a pixel histogram of a difference between the second image and a blurred fourth image generated from the second image.

52. The apparatus of claim 51, wherein the classifying is performed on a set of video frames of a video sequence, and the most likely classification result emerging out the classification results of the individual frames is taken as the class of the video sequence.

53.-54. (Canceled)

55. (Cancel)

56. (Cancel)

57.-59. (Canceled)

60. The method of claim 1, wherein generating a blurred third image from the first image further comprises applying a Gaussian filter to the first image.

61. (Canceled)

62. The method of claim 1, wherein the first image further comprises all frames in a video stream.

Allowable Subject Matter

2. Claims (1, 3-6, 14-15, 18, 20-22, 33-34, 43-46, 51-52, 60, and 62 (renumbered as 1-21) are allowed.

3. The following is an examiner's statement of reasons for allowance:

Per the applicant amendments and the persuasive arguments filled on 6/19/2006 (see remarks) all the rejections to the claims have been withdrawn and the claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikkram Bali whose telephone number is 571.272.7415. The examiner can normally be reached on 7:00 AM - 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571.272.7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vikkram Bali
Primary Examiner
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vb
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